

National Marine Fisheries Service

SOUTHWEST REGION

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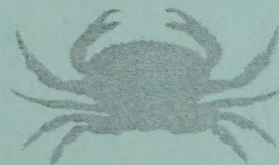
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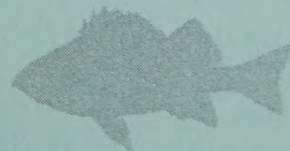
FISHERIES MANAGEMENT AND DEVELOPMENT RESEARCH NEEDS

by

THE STAFF OF THE SOUTHWEST REGION



MARCH 1986



ADMINISTRATIVE REPORT SWR-86-3

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The region visited
on collecting MBO's?
Where is Proxmire?
When we need him?

Note how Pg. 21

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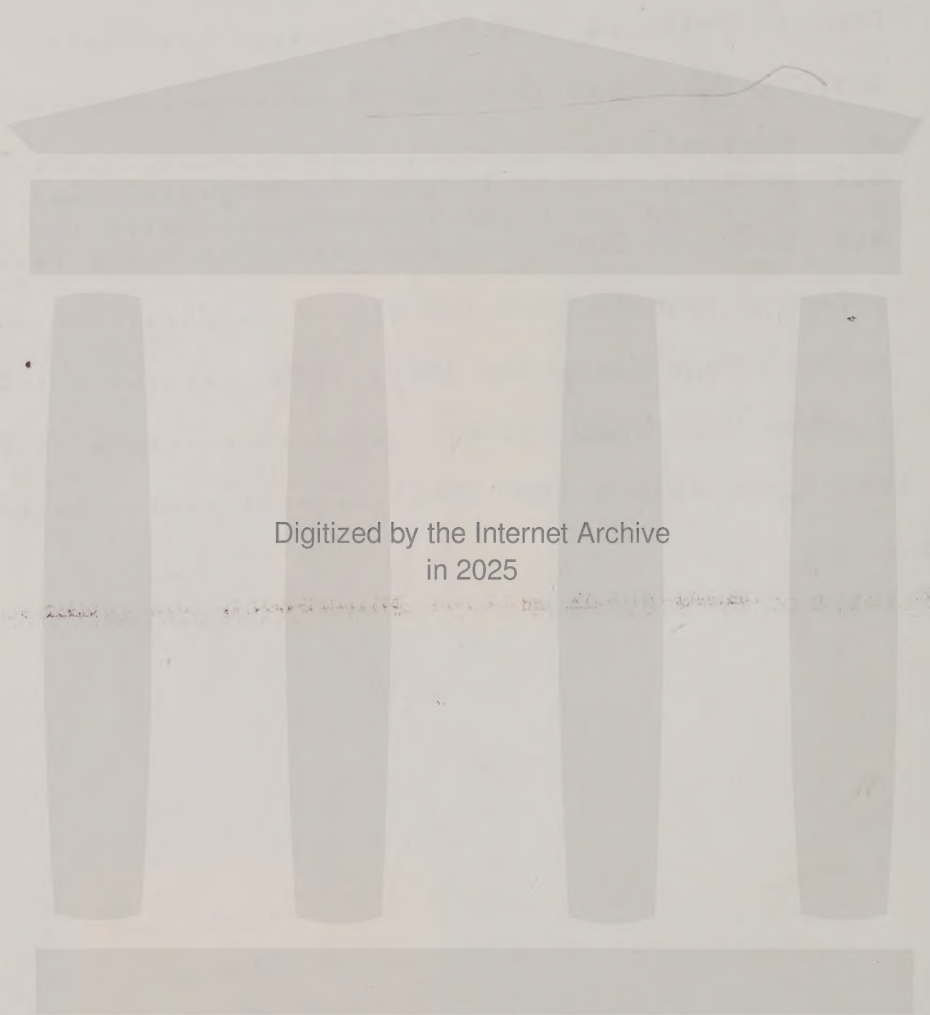
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1.0 - INTRODUCTION

For planning and management purposes, the nation's primary living marine resources are divided into species or species groups under a specific objective or management objective.

In the National Marine Fisheries Service's (NMFS) Southwest Region (which includes California, Nevada, Arizona, Hawaii, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the United States Trust Territory of the Pacific Islands), six management objectives have been established under a Southwest Region Strategic Plan (see Appendix) for west coast groundfish, coastal pelagic fishes, insular fishes, protected species, Pacific and Indian Ocean tunas, and albacore tuna (Table 1). The Southwest Region is responsible for coordinating west coast groundfish activities with the NMFS Northwest Region and Northwest and Alaska Fisheries Center and in turn provides the Northwest Region with California salmon information to assist them in meeting their coordination responsibilities for west coast salmon.

Initial fiscal year 1986 funding for the Southwest Region and Southwest Fisheries Center in support of these management objectives is \$18.4 million (Table 2).

This administrative report was prepared by the Southwest Region staff in California and Hawaii to identify current and future research needs to support the region's fisheries management and development programs. It is intended to provide direction and priorities to the Southwest Fisheries Center, our primary source of research support.

The continuing support provided by the Southwest Fisheries Center is responsible, in large part, for the success of our current programs. Through their leadership and expertise in quantitative population biology, economics, automatic data processing management, and interactive planning and management, the Southwest area resources and constituents enjoy effective conservation, management, and development of the region's high sea and coastal living marine resources and habitat.

TABLE 1: Southwest Region Fisheries

MSQ Unit	Species	Plan	Status of Stock			Data Year	Status of Fishery					
			MSY (mt)	OY (mt)	Trend		Comm (mt)	Rec (mt)	Subs (mt)	Total (mt)	TALFF (mt)	JV (mt)
Groundfish (Coastwide)	Whiting	FMP	189,000	295,800	increasing	1985	3,900	neg	NA	3,900	50,700	31,500
	Flatfish	FMP	34,400	40,300	stable	1985	30,200	neg	NA	30,200	0	0
	Rockfish (uncl.)	FMP	44,200	41,300	stable	1985	28,000	4,200	NA	32,200	0	0
	Widow Rockfish	FMP	11,900	9,300	decreasing	1985	9,000	200	NA	9,200	0	0
	Sablefish	FMP	10,600	13,600	stable	1985	14,000	neg	NA	14,000	0	0
	Other	FMP	38,000	36,800	stable	1985	5,100	neg	NA	5,100	0	0
Coastal Pelagics	N. Anchovy	FMP	305,000	150,000	increasing	1985	6,600 ^{2/}	0	NA	6,600	0	0
	Pac. Mackerel	none	25,000	NA	stable	1985	34,200	880	NA	35,080	0	0
	Jack Mackerel	none ^{4/}	100,000 ^{5/}	NA	decreased	1985	9,500	0	NA	9,500	0	0
	Bonito	none	unk	NA	stable	1985	2,400	1,450	NA	3,850	0	0
	Squid	none	unk	NA	increasing	1985	9,300	0	NA	9,300	0	0
Insular Fisheries	Bottomfish	none	750	NA	decreasing	1984	740	6/	6/	750	0	0
	Spiny Lobster	FMP	200	200	decreasing	1985	440	unk	neg	440	0	0
	Slipper Lobster	FMP	unk	NA	unk	1985	170	neg	neg	170	0	0
	Seamount	PMP	unk	NA	depleted	NA	0	0	0	0	0	0
	Groundfish ^{7/}											
	Billfish and Other Pelagics	PMP	NA	NA	stable	1984	1,000	6/	neg	1,000	0	0
Tropical Tuna	Yellowfin (ETP)	NA ^{8/}	175,000	NA	stable	1984	54,300	neg	neg	54,300	NA	NA
	Skipjack (ETP)	NA	unk	NA	stable	1984	20,000	neg	neg	20,000	NA	NA
	Yellowfin (WP)	NA	unk	NA	unk	1984	45,200	neg	neg	45,200	NA	NA
	Skipjack (WP)	NA	unk	NA	stable	1984	124,900	neg	neg	124,900	NA	NA
Albacore	Albacore (NF)	NA	118,000	NA	stable	1985	7,320	80	neg	7,400	NA	NA
Salmon ^{9/} (California)	Chinook	FMP	NA ^{10/}	NA	Sacramento, stable	1985	360,300	164,400 ^{11/}	11,600 ^{12/}	536,300	0	0
	Coho ^{13/}	FMP	NA ^{10/}	NA	Klamath, depressed	1985	11,100	15,200	neg	26,300	0	0

MSQ Unit	Species	Status of Stock			Estimated Mortality in Comm Fisheries
		Current	MNP ^{14/}	Trend	
Protected Species	Harbor porpoise	3,000	unk	unk	300/yr
	Harbor seal	20,000	at/above	stable	800/yr
	California sea lion	80,000	at/above	increasing	2,000/yr
	Monk seal	1,500	below	stable or decreasing	unk
	Bumpback whale	1,000 - 2,000	below	unk	unk

NA = Not Applicable neg = negligible unk = unknown

1/ Data from 1984 where available

2/ Includes lingcod, Pacific cod, northern jack mackerel, and others

3/ Includes live bait

4/ Northern portion under groundfish FMP; southern portion under State regulations

5/ Southern portion, small fish

6/ Recreational catch included in commercial catch estimate

7/ Moratorium until 1990

8/ Non-binding quota regime under IATTC

9/ Catch reported in numbers of fish

10/ Stocks managed for escapement; MSY irrelevant

11/ Includes in-river sport catch

12/ Klamath Indian catch

13/ Relatively less significant in California

14/ Current condition relative to maximum net productivity (MNP) level

TABLE 2: FY 1986 MBO Program Funding, Southwest Region and Southwest Fisheries Center Combined

Program Activities/ MBO Code: Short Title:	III-1 G/F	III-2 C/P	III-3 INS	III-4 P/S	III-5 T/T	III-6 ALB	IV-1 SAL	Regional Totals (FK)
INFORMATION ACQUISITION								0
o Resource Survey	218.5	341.8	318.8	324.9	94.1	87		1385.1
o Resource Biology	719	547.6	318.8	629.1	149.4	126		2489.9
o Habitat Ecology		49.8	361		25	149		584.8
o Catch Statistics			151.8			63		214.8
o Economic Data			15.2					15.2
o Analysis/Modeling	677.2	429.8	379.4	615	569.5	204		2874.9
o Data Mgt./Disse.	303.2	142.3	456.3	407.2	273	124.8		1706.8
o GRANTS TO STATES		315	260.8				425.2	1001
Info-acq. Subtotal	1917.9	1826.3	2262.1	1976.2	1111	753.8	425.2	10272.5
MANAGEMENT OPERATIONS								
o Plan Dev./Approvl.								
o Regulations/Permits	217.5	104	155.4	15	92.4	32.6	94.7	711.6
o International Mgt.	102.1	78		172.5				352.6
o Habitat Conservation								0
o Enforcement	112		55.8				141.2	309
o Observer Operations	179.7		74.9	359.4			134.6	748.6
o Hatchery Operations				1264.7				1264.7
o REGIONAL COUNCILS			700					0
Mgmt. Ops. Subtotal	611.3	182	986.1	1811.6	92.4	32.6	370.5	4086.5
DEVELOPMENT PROGRAM								
o Ind. Devel./Trade	116	74	43.9			10.9		244.8
o Devel. Grants (S/K)	527.7		500.3		40	160		1228
o Prod. Util. & Safety								0
o Financial Svcs.					19.9			19.9
Dev. Prog. Subtotal	643.7	74	544.2	0	59.9	170.9	0	1492.7
Management Fund	422.6	332.8	441	435.2	244.7	165.4		2041.7
	79.2	26.4	132	52.8	105.6	26.4	105.7	528.1
Priority Rank:	1	2	2	1	3	3	1	
MBO Totals	3674.7	2441.5	4365.4	4275.0	1613.6	1149.1	901.4	18421.5

NOAA Research Vessel Days: 636

Charter Vessel Days: 0

2.0 - WEST COAST GROUND FISH FISHERY (MBO III-1)

1. Description of the Fishery

The commercial groundfish fishery (including joint ventures) harvested about 170,000 mt and 120,000 mt in 1984 and 1985, respectively. The estimated ex-vessel value of the domestic commercial catch was \$60 million in 1984 and about \$54 million in 1985. Domestic shoreside landings were 90,000 mt and domestic harvests in joint ventures with foreign processing vessels were about 80,000 mt in 1984 and 31,500 mt in 1985. The number of domestic trawl vessels increased from 280 in 1976 to 430 in 1984, and the use of other gear (especially gill nets) has grown substantially in some areas. Most of the traditional species are fully utilized and there is far more capacity available than is necessary to harvest them. Fishing for Pacific ocean perch, sablefish, widow rockfish and the Sebastes complex is tightly controlled to prevent overfishing and/or to rebuild the stocks. A few species such as Pacific whiting, shortbelly rockfish and jack mackerel are underutilized. This reflects slower development in the processing sector due, in part, to the high risk involved in product and market development. There also is limited access to foreign markets for such products which further hampers development of the domestic processing sector, especially for non-traditional species.

The groundfish fishery is managed by a framework fishery management plan (FMP) involving in-season and between-season adjustments which require accurate and timely stock assessments and fishery data. Careful coordination of management actions among federal and state agencies is necessary due to the interjurisdictional nature of the fishery. Active enforcement presence is necessary to ensure compliance with the management regime. Some species in the groundfish complex are estuarine dependent, so efforts are needed to ensure that land and water uses do not adversely affect the productivity of these estuaries.

2. Management Objective

Maintain and manage the West Coast groundfish fishery at optimum yield (OY) and achieve exclusive harvest and processing by U.S. commercial and recreational fishermen and processors by 1995.

The variety of species involved and the variety of gear used to catch those species are the key hurdles in achieving in the groundfish fishery. The groundfish resource should be viewed as a unit because the constituent stocks cannot be caught selectively. It is necessary to optimize the yield from the mixture of species rather than from each species individually. However, to determine the OY from the groundfish resource, we

must study the effect of fishing pressure on the assembled species and the major component species.

Obtaining the greatest yield in pounds is only part of the challenge. Net economic yield is affected by the type of vessels and gear used and the geographic and seasonal pattern of landings. Also, recreational fishery interests are involved in some species and areas.

To achieve the goal of exclusive fishing and processing by domestic interests by 1995, problems relating to product quality and inability to compete with import substitute products must be resolved.

3. Regional Strategy

The Southwest and Northwest Regions cooperate with state agencies and the Pacific Fishery Management Council in making and implementing annual and in-season management decisions to best use the groundfish resource. Current landings from the fishery are collected by the states through funding by NMFS and reported through the Pacific Fisheries Information Network. Different management approaches need to be evaluated to control overall fishing capacity in a rational and cost-effective manner while promoting full use of non-traditional species.

The Southwest Region supports projects to develop methods for handling, processing and preserving various groundfish species to improve product quality and safety. Using groundfish in non-traditional product forms and identification of new export market opportunities for non-traditional species is also supported. Saltonstall-Kennedy grants should emphasize enhancing the marketability of underutilized stocks. Financial assistance for vessel owners needs to be tightly focused to ensure that additional stress is not placed on fully utilized stocks.

The Southwest Region habitat conservation program reviews and recommends restrictions on permits for developing coastal and estuarine areas. In cases where a project will reduce the quantity or quality of marine fish habitat, methods of mitigating damages from the project are recommended. The object of this process is to ensure there will be no further net loss of habitat in the region.

4. Research Needs

High Priority

- Complete periodic status of stocks reviews, including abundance and allowable catch of sablefish, lingcod and Sebastalobus spp. These species have high value for commercial fishermen and provide excellent products for consumers. Lingcod are also a highly prized sportfish. Sablefish abundance has been estimated on a regular basis, but the methods used have been challenged by fishermen as not considering the full distribution of sablefish. Abundance and productivity of lingcod and Sebastalobus are not known nor are fishery impacts on these two species.
- Examine thoroughly the ratio of benefits to costs related to in-season trip limit adjustments. The current management system requires nearly real-time data reporting for species under quota management and for harvest guideline species. The benefits of this fine scale management and the potential savings and risks from using multiple year quotas or trip limits which are held constant through a year have not been quantified.
- Complete an analysis of alternative limited access systems to inform the fishing industry of the options available. This work is now nearing completion.
- Complete an economic and biological analysis of the potential for managing rockfish harvest by trawl mesh size requirements.

Secondary Priority

- Assess the status and potential harvest of species other than the high priority ones including underdeveloped species (e.g. whiting, shortbelly rockfish, and grenadiers).
- Complete a study of the dependence of groundfish species on coastal and estuarine habitats. This information would help the Region to formulate better recommendations for mitigating development project impacts and strengthen our objections to inappropriate projects.
- Develop and test methods to predict recruitment in groundfish species. If recruitment can be predicted, resource management and business management decision-making can be improved.

3.0 - COASTAL PELAGICS FISHERY (MBO III-2)

1. Description of the Fishery

The coastal pelagics fishery consists of commercial and recreational fishermen pursuing anchovy, Pacific and jack mackerel, bonito, and squid. The sardine population is growing and a limited harvest is now allowed.

Commercial fisheries include harvest of anchovy for reduction to industrial products (fish meal, oil, and solubles), for live and frozen bait, and for human consumption; Pacific and jack mackerel for canning, pet food, and fresh consumption; bonito for canning and fresh consumption; and squid principally for fresh and frozen use. Anglers use anchovy and squid (when available) for bait, and they catch large numbers of Pacific mackerel and bonito. Pacific mackerel has become the mainstay of the southern area commercial fleet as well as being the pelagic fish most commonly caught by recreational fishermen. This reflects a remarkable recovery for this species which was severely depleted in the 1965-75 period.

The southern California commercial wetfish fleet consists of 45+ vessels using round haul nets. Commercial landings and value have fallen substantially in both nominal and inflation-adjusted terms since 1980-81 for several reasons. First, the market for northern anchovy reduction fishery products has been very weak, with intense price competition from soybean meal and South American fish meal. Fishermen have been unwilling to deliver anchovy at the ex-vessel price offered by processors. Second, squid virtually disappeared in 1983 and 1984, as did bonito, probably in association with the warm water conditions of El Niño. Third, the real ex-vessel price for mackerel has fallen each year since 1981, probably also a result of price competition from similar products, including foreign products. Total nominal ex-vessel revenue from coastal pelagic species was almost \$23 million in 1981 but dropped to about \$11.4 million in 1984. Tuna occasionally are taken by wetfish vessels, and tuna landings on occasion have offset declining coastal pelagic species landings since 1981, reaching a value of \$5.6 million in 1984. Tuna landings, however, are neither a predictable nor a reliable revenue source for this fleet. In addition, herring are taken by Monterey based vessels operating in San Francisco Bay during the winter months.

Coastal pelagic species are significant for recreational fisheries as bait (anchovy and occasionally squid) and as major components of the catch (Pacific mackerel and bonito). The value of the live bait catch has been about \$2.5 million per year recently. Pacific mackerel has become the most frequently caught species in the recreational fishery, accounting for about 31 and 25 percent of total southern California recreational catch,

respectively, in 1983 and 1984. Pacific bonito accounted for another 7 percent of southern California recreational catch in each of those years. Commercial passenger fishing vessels accounted for about 35 percent of southern California angler days in 1983 and about 34 percent in 1984; private boats accounted for 26 percent and 27 percent of all trips in those years respectively. While the coastal pelagic species are not exclusively responsible for investments in and expenditures on recreational fisheries, the existence of these species is responsible for substantial economic benefits to fishermen and suppliers.

2. Management Objective

Manage coastal pelagic fisheries at optimum yield (OY) and achieve maximum harvest and utilization by U.S. commercial and recreational industry by 1995.

Achievement of the objective will be difficult for several reasons. First, the volatility of stock abundance and availability in nearby waters makes it difficult for industry to make long-term predictions about harvestable levels and in turn to plan investments accordingly. Second, markets for coastal pelagic species are weak, due in part to the recent high value of the dollar and the availability of low priced substitutes (e.g., soybean). Third, the stocks are transboundary with Mexico, but there is no arrangement for a common management regime to maximize the economic value from the fishery, and exchange of scientific and fishery data has been limited in recent years. Fourth, marine mammal interactions may be adversely affecting recreational and commercial fishermen.

3. Regional Strategy

The Northern Anchovy Fishery Management Plan (FMP) provides a procedure for annual adjustments in anchovy quotas as the spawning biomass changes. Other species are managed under California Department of Fish and Game (CDFG) programs. The NMFS is working closely with the CDFG to ensure that anchovy management under the FMP is coordinated with other coastal pelagic fishery management decisions by the state. This includes cooperation in developing methods to mitigate the effects of interactions of marine mammals with coastal pelagic fisheries. Efforts are continuing to improve data exchange between the U.S. and Mexico. Little can be done by the NMFS to improve market conditions for coastal pelagic species products. Efforts are being made to assist in development and test-marketing of alternate product forms for Pacific and jack mackerel through industry and government participation in sales missions, trade shows, and international negotiations.

4. Research Needs

High Priority

The highest priority for research is the need for better information on the economic conditions of the fishery. The fishery is market-driven. Markets for most traditional products are relatively weak, but the factors responsible are not well understood. Better information is needed for industry investment planning and for assessing the management implications if market conditions change. Among the important topics are:

- Assess the implications of changes in U.S. and foreign markets for mackerel in recent years for U.S. fishermen and processors.
- Assess the market for sardines and associated products if the sardine stock continues to expand, and the potential for this fishery to provide some hope for improved earnings by the local wetfish fleet.
- Determine the effects of the decline in the value of the U.S. dollar on the markets for coastal pelagic species products in the U.S. or foreign markets.
- Evaluate the effects of the virtual disappearance of squid following El Niño on markets for local squid.
- Determine the changes in major cost elements for local vessels in the past five years.
- Describe the effect (if any) of the imposition of a size limit for bonito on stock size, landings, and values, and the potential for changes in fishery regulations which would permit improvements in productivity of local vessels.
- Describe the potential impacts on the economic viability of the local fleet by port or marina development, water quality control, or other plans and programs in Los Angeles Harbor.

Secondary Priority

Some related biological research questions of second priority are:

- Ascertain whether the full effect of El Niño has been determined.
- Evaluate whether there are any reliable predictors of squid abundance and availability in the Southern

California Bight and Monterey Bay area, and if not, whether there is any reason to expect such a predictor can be developed in the near future.

- Evaluate the potential effects of a successful squid fishery off Oregon and/or northern California on abundance or availability of squid to southern California vessels.
- Complete an analysis to determine whether jack mackerel and Pacific mackerel stocks are inversely related.
- Describe the effects of habitat modification in inshore areas on the abundance, availability, or variability of coastal pelagic species in the Southern California Bight.

4.0 - INSULAR FISHERIES (MBO III-3)

This management objective encompasses several fishery components. Each component is described separately in the following sections.

4.1 - BOTTOMFISH

1. Description of the Fishery

The Western Pacific bottomfish complex includes 19 commercially or recreationally important species of snappers, groupers, jacks, and emperorfishes. The fishery for these species is important because of growing commercial activity, high fresh market prices, strong consumer demand, extensive recreational involvement and subsistence use in Pacific Island communities. Bottomfish in the Fishery Conservation Zone (FCZ) are harvested primarily with vertical hook-and-line gear and, to a lesser extent, with bottom longlines and traps.

Commercial bottomfish landings and fishing effort are at record high levels in the FCZ off the main Hawaiian Islands and the Northwestern Hawaiian Islands (NWHI). Estimated bottomfish landings in Hawaii for 1985 totaled 1.6 million pounds valued at close to \$4 million. Around the main Hawaiian Islands the commercial fishery is composed of some 100 vessels landing bottomfish regularly and perhaps 1,000 vessels which land bottomfish intermittently. The NWHI fishery is a commercial fishery involving approximately 20 large vessels.

In American Samoa, Guam, and the Northern Mariana Islands, commercial bottomfish fisheries are a more recent development and smaller in scale than in Hawaii. Nevertheless, they have become the mainstay of local fishing industries. In 1984, estimated commercial bottomfish landings in the territories totaled 105,000 pounds valued at \$188,000. Approximately 100 vessels in the territories were engaged in commercial bottomfish fishing. Data on the important subsistence fisheries are not available.

2. Management Objective

Manage the bottomfish fishery at optimum yield (OY) while maintaining artisanal and subsistence fisheries.

The central problem confronting the bottomfish fisheries of Hawaii and the Pacific territories is that fishing pressure in terms of vessels and fishing power has increased drastically in the past 10 years. Although the scientific evidence of potential overfishing is not complete, the low rate of production and

relatively high unexploited standing stock characteristic of many bottomfish species may well preclude their rapid recovery from overfishing. Hawaiian fishermen in particular have clearly voiced their fear that the frequency of smaller-sized fish and lower catch rates are evidence that the fishery is approaching a danger point where effective resource management is essential.

3. Regional Strategy

The Southwest Region is focusing its effort to manage the bottomfish fishery through implementation of a framework fishery management plan (FMP) proposed by the Western Pacific Fishery Management Council. The intent of the framework FMP is to establish a process by which annual or in-season management measures may be implemented promptly in response to changes in the fishery. This preventive strategy is preferable to managing the fishery in reaction to emergency situations.

4. Research Needs

- Complete various biological studies on age and growth, size at maturity, natural and fishing mortality on the key species of interest for effective monitoring and management of the stocks.
- Develop maximum sustainable yield (MSY) and OY for key species.
- Develop and maintain an adequate reporting and monitoring system for catch and effort on key species.
- Obtain adequate economic data on the vessels and the fishery.
- Establish a mechanism to better educate fishermen and the general public on the condition of the stocks to help implement management measures.
- Continue research on the effectiveness of deep water artificial reefs for purposes of habitat and stock enhancement.
- Support market studies on the acceptability and economics of delivering frozen bottomfish (to test new development opportunities).

4.2 - WESTERN PACIFIC LOBSTER FISHERY

1. Description of the Fishery

The western Pacific lobster fishery consists of several species of spiny and slipper lobsters. While the territories of Guam and American Samoa have small commercial and subsistence fisheries for spiny lobsters, the only known concentrations of commercial stocks of spiny and slipper lobsters are located in the Hawaiian archipelago, particularly the Northwestern Hawaiian Islands (NWHI). The NWHI lobster fishery is a trap fishery and is managed by a fishery management plan (FMP) which was implemented in 1983. In 1985 the Hawaii lobster fishery produced approximately 1.2 million pounds of spiny lobsters worth \$3.5 million and 377,000 pounds of slipper lobsters worth \$704,000. In 1985, 16 vessels actively participated in the fishery.

2. Management Statement

Manage the lobster fishery at optimum yield (OY) while maintaining artisanal and subsistence fisheries.

The fishery in the NWHI has developed rapidly since initial resource assessment cruises were carried out in 1975. The rapid growth of the lobster fishery and the many changes which accompanied this growth have made it extremely difficult for resource management agencies to respond with prompt and effective management measures. Intensive fishing pressures exerted on this high valued resource poses a serious problem for potential overfishing.

3. Regional Strategies

The Southwest Region is focusing its effort to manage the lobster fishery through the FMP for spiny lobsters developed by the Western Pacific Fishery Management Council. Since the FMP was implemented in 1983, three amendments and two emergency rules have been enacted in response to management needs. The present strategy is to move the Western Pacific Council in the direction of an escape gap requirement for lobster traps in order to reduce fishing mortality on sub-legal lobsters and to restructure the FMP into a framework plan to allow a more rapid and flexible response to management needs. Consideration will also be given to management measures for slipper lobsters which emerged as a valuable component of the catch in 1985.

4. Research Needs

- Continue status of stocks assessments via catch monitoring and at-sea research to provide timely information to the Western Pacific Council on a continuing basis.
- Determine relationship of spawning stock size to recruitment for spiny and slipper lobsters. It may be necessary to do so on separate banks in the fishery.
- Continue assessment of natural and fishing mortality of the stocks including escape gap research and other methodologies to address immediate management concerns.
- Improve economic analysis of the lobster fishery to provide a basis for adopting or rejecting limited entry schemes.
- Develop the ability to predict the strength of various year classes of the stocks and determine how this may relate to fishing effort, natural mortality, etc.
- Continue research efforts to establish an appropriate minimum size of lobsters under various ecological and economic regimes.
- Determine why the abundance and size distribution of lobsters varies from bank to bank.

4.3 - BILLFISH AND OTHER PELAGICS (EXCLUDING TUNA)

1. Description of the Fishery

The billfish fishery consists of several species of marlin, spearfish, sailfish, and swordfish. Other pelagic species of interest are wahoo, dolphin fish and various oceanic sharks. These species are targeted by domestic fishermen in Hawaii and each of the flag territories and are taken by a variety of gear types, although longline and troll are the predominant harvesting methods. These migratory species are also taken by foreign longline, drift gill net, pole-and-line and purse seine vessels outside the Fishery Conservation Zone (FCZ). Billfish in particular are an important economic resource to the charter recreational fishing industry in Hawaii and the Pacific territories. Domestic longline harvest of pelagic species is concentrated in Hawaii. Trolling is the predominant harvesting method in the Pacific territories.

The value of commercial landings of billfish and other pelagic species in Hawaii is estimated by the Western Pacific

Fishery Management Council at \$2.5 million per year. These species are also acknowledged for their contribution to Hawaii's charter recreational fishing industry estimated at \$18 million gross revenues per year.

Commercial landings of billfish and other pelagic species in the Pacific territories for 1984 are estimated to be worth \$251,000. Data on recreational and subsistence value are not available.

2. Management Objective

Manage billfish and other pelagic species at optimum yield (OY) while maintaining artisanal and subsistence fisheries.

The essential problems to achieving OY for billfish and other pelagic species are the inability of a single nation to effectively manage such migratory species in the absence of international agreements and the potential difficulties in allocation of opportunity among gear types.

3. Regional Strategy

The Southwest Region presently manages billfish and other pelagic species in the western Pacific under a preliminary fishery management plan (PMP) implemented in 1980. In an effort to correct a number of deficiencies in the PMP, Southwest Region is working with the Western Pacific Council to replace the PMP with a fishery management plan (FMP) intended to enhance domestic fisheries for the management species. The proposed FMP will establish closed area for foreign fishing vessels, prohibit the use of gill nets, and establish a data collection program to monitor the take of the management plan species. A key element of this management strategy is to improve the climate of fishery relations with interested foreign nations to promote the development of international agreements for managing migratory species throughout their range in the Pacific.

4. Research Needs

- Obtain detailed catch and effort data on pelagic species from domestic and foreign vessels operating throughout the western Pacific.
- Conduct biological studies on the age size relationship of major species, their reproductive processes, and stock definition for future international management consideration.
- Conduct economic studies on the recreational importance of billfish and other pelagic species to guide management actions. Cost/earnings data for domestic vessels are needed to support such studies.

4.4 - DEEP-SEA SHRIMP

1. Description of the Fishery

The deep-sea shrimp (Heterocarpus spp.) fishery in the western Pacific has the resource potential to become perhaps the second largest (in terms of landings) commercial fishery in the region, following pelagic species. Harvestable stocks occur in the Hawaiian chain and off all Pacific territories. Deepsea shrimp occur at 300 to 400 fathoms and are harvested by setting baited traps. It is exclusively a commercial fishery with no participation by recreational or subsistence fishermen.

In 1984, a catcher/processor fleet of four large vessels harvested an estimated 350,000 pounds of deep-sea shrimp in Hawaii. Smaller day boats around Hawaii harvested an additional 50,000 pounds in 1984. Most of the catch was taken in waters around the main Hawaiian Islands. The estimated value of the 1984 harvest is \$1.2 million. In 1985 the shrimp catcher/processor fleet ceased operations. Present landings of deep-sea shrimp are made by occasional day boats. Sporadic landings of deep-sea shrimp also occur in Guam.

2. Management Statement

Manage the deep-sea shrimp resource at optimum yield (OY).

There is no pressing need for management of the shrimp resource at this time. The problems confronting the fishery are essentially development rather than management oriented. There are three primary impediments to development of the fishery. First, the extensive gear loss experienced by commercial fishermen at operating depths highlight the need for improved trap design and deployment techniques. Improved quality control is needed to counter the rapid perishability of deep-sea shrimp. Finally, export market development is necessary to ensure the commercial viability of a commercial deep-sea shrimp fishery.

3. Regional Strategy

The present monitoring effort of the Southwest Region (SWR) is low-keyed. When changes in the fishery so warrant, the SWR will work with the Western Pacific Fishery Management Council to develop appropriate management measures. Development problems confronting the fishery may be addressed by industry groups making use of available NMFS industry assistance programs.

4. Research Needs

- Conduct research aimed at extending the shelf life of deep-sea shrimp as a fresh and frozen product to support market development.
- Develop and test improved gear development and trap design to improve operational efficiencies in the fishery.
- Conduct surveys of potential shrimp grounds in American Samoa to round out the initial series of resource surveys for U.S. Pacific territories.
- Conduct biological studies on population structure, the reproductive process, growth rates, and mortality rates of deep-sea shrimp for future management decisions.

5.0 - PROTECTED SPECIES MBO (III-4)

1. Description of the Resources

Many species protected under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) are found in the Southwest Region (SWR), including gray whales and coastal pinnipeds off California; porpoise in the eastern tropical Pacific (ETP); and humpback whales, Hawaiian monk seals and several species of marine turtles in the central and western Pacific.

The gray whale population has recovered to 17,000 whales. Increasing levels of disturbance and habitat degradation are continuing threats in need of management.

Coastal marine mammal populations have increased such that conflicts with commercial and recreational fisheries off California are increasing. Some interactions have reached levels that may be affecting marine mammal populations.

Porpoise stocks incidentally taken in the ETP tuna fishery are stable or increasing, but continued regulation of incidental take and additional study of stock abundance is necessary. Hawaiian monk seal and sea turtle populations are stable at low numbers. No trends in population growth are apparent as the result of recovery actions implemented since 1983.

Humpback whales are also threatened by increasing levels of disturbance and habitat degradation. The north Pacific population is estimated at 1,200 whales, but no recent information on trends in population growth is available.

2. Management Objective

Manage protected species to achieve the optimum population levels for delisting while permitting associated commercial and recreational fisheries to continue.

The greatest hindrance to achieving program objectives is the lack of adequate information on status of stocks and rates of incidental mortality and on the effects of human activities on the health of protected populations.

3. Regional Strategy

The SWR manages incidental take problems through the General Permit Provisions of the MMPA. Under the MMPA, before NMFS can permit an incidental mortality of marine mammals in commercial fisheries, it must provide information on status of stocks, expected mortality rates, and impacts of incidental mortality on stocks and ensure that authorized levels of mortality will not disadvantage the stocks. High priority species in California are California sea lions, harbor seals, and harbor porpoise. High priority fisheries are the drift gill net fishery and set gill net and trammel net fisheries.

Research is underway at the Southwest Fisheries Center (SWC) to determine the status of the high priority species with respect to their optimum sustainable population levels. These reports will be available in early 1987. The SWR is funding the California Department of Fish and Game to monitor marine mammal mortality rates in the high priority fisheries.

Based on trends in indices of abundance, the California sea lion and harbor seal populations are apparently sustaining current levels of incidental mortality. There is insufficient information available to estimate precisely maximum levels of allowable take for these populations, therefore, monitoring programs are necessary to ensure that authorized levels of incidental mortality are not resulting in population declines.

The SWC and National Marine Mammal Laboratory are cooperating in annual surveys to monitor pup production in the California sea lion population. Pup production appears to be a good index for monitoring trends in abundance of sea lions and inferring effects of incidental mortality.

An aerial census of total harbor seals hauled out during peak haulout periods in June was identified as an index that could be monitored to watch for impacts of incidental mortality on the harbor seal populations. The SWC has identified concerns about variability in proportion of the population hauled out at various sites within years and between years that may affect the usefulness of this index. Research is needed to verify the usefulness of the index currently being monitored or to develop a new index.

Harbor porpoise are taken in large numbers in gill and trammel net fisheries. Little is known about harbor porpoise in California so it is difficult to determine the acceptable levels of mortality or to predict the effect of incidental mortality on the population or local groups that may exist along the coast. In the spring of 1986, the SWR plans to propose modification of

an existing general permit to authorize a take of two percent of the population incidental to commercial fisheries. A critical element of this plan is the development of a population monitoring program to monitor changes in abundance at the population level and at the local group level. Without a monitoring program, the NMFS will be unable to satisfy the disadvantage test prescribed in the MMPA and will likely be faced with a decision to intervene in a state managed fishery to control harbor porpoise mortality with federal regulations.

Apart from incidental mortality, complaints about the effect of growing marine mammal populations on populations of commercial and sportfish species are increasing. There is little information available to describe the dynamics of competition between marine mammals and fishermen. For example, what proportion of the sea lion's diet is composed of commercial fish species? Do they forage on different age classes than commercial and sport fisheries, and if so, how does sea lion predation affect recruitment to populations of commercial and sportfish? Studies of marine mammal food habits combined with ongoing studies of fish population dynamics would lead to an understanding of the competition problem and may identify management options to resolve problems.

Other marine mammals, mostly dolphin, are taken at unknown rates in seine and drift net fisheries. For the most part these populations are probably at optimum levels and observed rates of incidental mortality are small compared to population size. Assessments of the status of these stocks are desirable but not essential.

Protected species research needs in Hawaii are centered on implementing the Hawaiian Monk Seal Recovery Plan published in 1983, and the Hawaiian Sea Turtle Recovery Plan expected to be published in 1987. The Honolulu Laboratory of the SWC is conducting research to meet the SWR's needs with respect to monk seals and sea turtles.

In the eastern tropical Pacific, tuna purse seine vessels fish for yellowfin tuna associated with porpoise. The NMFS monitors the incidental kill by fielding observers (cooperatively with the Inter-American Tropical Tuna Commission) on a sample of tuna vessels at sea. Several stocks of porpoise have been identified for management purposes. Some stocks of the same species occur in the same areas and apparently interbreed to produce intergrade phenotypes. Mortality quotas are established for each stock within a species and the intergrade phenotypes must be assigned to one stock or the other. The method of identification must be applicable at sea and cannot rely on dissection. The division of stocks has been characterized as "provisional" and should be reviewed.

4. Research Needs

a. California

High Priority

- Develop program to monitor changes in distribution and abundance of harbor porpoise at population and local levels.
- Define stock structure of harbor porpoise populations.
- Define life history parameters for harbor porpoise to assist in setting levels of allowable take.
- Validate harbor seal population monitoring program or develop an acceptable program.

Secondary Priority

- Conduct food habits studies for California sea lions, harbor seals, and elephant seals.
- Assess impact of marine mammal populations on recruitment of fish to populations exploited by commercial and sport fisheries.
- Assess status of delphinid stocks that are taken incidentally in commercial fisheries, e.g., pilot whales, common dolphins, Pacific white sided dolphins, and bottle nosed dolphins.

b. Hawaii

Currently the SWR's most critical research need in Hawaii is an assessment of the status of the north Pacific humpback whale population and the effects of increased human activities on the population in Hawaiian waters. The Region is responsible for advising other federal agencies of the likely effects of their activities on humpback whales and methods to eliminate those that are adverse. Information on changes in distribution, effects of vessel traffic on whales, etc. is needed. This problem falls under the purview of the National Marine Mammal Laboratory; the SWC does not maintain a large whale research program.

Turtles?

c. Eastern Tropical Pacific

High Priority

- Develop method to assess trends in porpoise populations using data collected by observers aboard tuna fishing vessels.
- Reassess separation of stocks within a species for management purposes, particularly eastern and whitebelly spinner dolphin.
- Determine most cost-effective sampling regime for stock quota monitoring, including an analysis of the impacts of different schemes on precision of mortality estimates.

6.0 - TROPICAL TUNA FISHERIES (MBO III-5)

1. Description of the Fishery

The United States tuna industry is somewhat stabilized after three years of unprecedented hardships. With the closure of four canneries in California and Hawaii and the loss of vessels with no replacements, the overall industry is in a smaller position worldwide.

The United States canning industry is made up of six companies with one plant in California, two in American Samoa, and five in Puerto Rico employing on an annual basis approximately 12,000 workers. Although cannery capacity declined due to plant closures, it increased somewhat in 1985 as plants in American Samoa and Puerto Rico upgraded their facilities. Production for light meat during 1985 was 27.6 million standard cases, a decline of 3.3 million standard cases or 13 percent from 1984 production. The pack was worth approximately \$533 million, a decline of \$83.2 million or 14 percent from 1984. Retail prices nationwide are being kept low as a result of the strong competition from imported canned product.

The United States tuna fleet ended 1985 with 93 purse seiners and 18 bait boats with a combined capacity of 100,524 short tons. The fleet has been significantly reduced over the past two years, with an 11 to 12 percent capacity loss for 1984 and 1985. Flag transfers ranked as the leading cause, with conversions and sinkings second and third, respectively. It is anticipated that this trend will continue at least through 1986, as some inactive vessels are purchased by foreign fishing companies and the remaining are converted to other fisheries. The replacement cost of the present-day fleet at current construction costs of \$10,000/short ton would be approximately \$1 billion. The main concern of vessel owners is escalating rates for various types of insurance that must be carried. A second major concern of the approximately 21 percent of the fleet which is independent of the major canners is the uncertainty of maintaining a reasonable ex-vessel price.

The high seas fleet is far ranging, with vessels fishing as far south as Peru in the eastern Pacific and as far west as Papua New Guinea in the western Pacific. The fleet dramatically shifted to the west during the El Niño years of 1983-84 but has returned to a balance of about 33 vessels in both the eastern and western Pacific. Five chartered vessels also operated in the western Atlantic during 1985. The probability of U.S. vessels venturing in the Indian Ocean is not as remote as first envisioned if they begin transshipping through Singapore. The Seychelles Fishing Authority reports that 130,000 short tons of yellowfin and skipjack were caught in the western Indian Ocean during 1985.

2. Management Objective

Maintain a continuing supply of reasonably priced tuna for the American consumer and the American fishing industry.

A key obstacle is maintaining access to tuna in the 200-mile Fishery Conservation Zone (FCZ) waters of other nations.

The U.S. is the largest consumer of canned tuna in the world as well as the second largest harvester. Historically, roughly half of the U.S. canning requirements for raw product is supplied by U.S. vessels. With the advent of the FCZ, access to productive waters by U.S. vessels has been hampered due to lack of international agreements with established nations as well as those emerging nations in the western Pacific. Second, the emergence of Asian nations producing canned tuna for export has also hampered harvesting by forcing U.S. companies to reduce ex-vessel price, sometimes below the cost of catching tuna. This has forced numerous vessels into foreclosure proceedings, at which time the vessels are sold below value mainly to foreign nations looking to expand their fleets. In addition, processors may be sustaining continued losses on production.

3. Regional Strategy

The NMFS, under the Magnuson Fishery Conservation and Management Act, maintains the right of access by U.S. vessels to highly migratory species of tuna in 12- to 200-mile FCZ waters. Southwest Region personnel actively participate in international negotiations to achieve access rights for the U.S. fleet in the central, western, and south Pacific areas. These personnel also assist in the ongoing negotiations regarding US-Mexico fishery policies as well as monitor the ratification of the Eastern Pacific Ocean Tuna Fishing Agreement. The NMFS directly assists the industry by providing background information to the U.S. Department of Agriculture for inclusion in their annual surplus commodity purchases of domestically caught and canned tuna. Other forms of assistance include the Fishing Vessel Obligation Guarantee program and the use of Saltonstall-Kennedy grants. The NMFS also has amended its tuna/porpoise program, converting many procedural regulations to guidelines in an effort to achieve the same protection for porpoise with less regulatory burden for the industry.

4. Research Needs

- Establish an international data base incorporating the entire Pacific region. Currently, the numerous data bases kept by Pacific Rim nations or compacts of free association are not compatible with one another. It is

of paramount concern that these data bases be merged to enhance research into optimum yield (OY) and like needs for the benefit of all the participating nations.

- Transfer technology and information gained in studying albacore alternative markets and information from "burned tuna" studies to local fisheries, utilizing seasonal runs of bluefin and yellowfin tuna.
- Develop quality and grading standards for fresh-frozen bluefin and yellowfin tuna.
- Transfer technology gained in albacore longline projects to assist local fishermen in the capture of bluefin and yellowfin tuna.
- Develop a model to examine the viability of insurance pools to counter the escalating prices of marine resources.
- Conduct research into the viability of utilizing satellite imagery and sea surface temperatures in tracking movements of local bluefin and yellowfin tuna.
- Convene an annual review panel to establish commercial and recreational needs in the tuna fisheries.
- Disseminate information on ongoing research and results routinely to the industry.
- Conduct and support research into improving the efficiency of the U.S. canning industry to reduce overall costs (i.e., viability of incorporating new forms of on-line butchering equipment, new packaging material).

7.0 - PACIFIC ALBACORE (MBO III-6)

1. Description of the Fishery

The U.S. Pacific albacore fishery presently occurs primarily north of 25° N latitude and offshore from the West Coast to approximately 180° longitude. This area comprises inshore and offshore areas, arbitrarily separated at 140° W longitude. Troll gear is the dominant gear type in the fishery. Purse seine gear rarely accounts for a significant portion of the catch, although 1984 was such a year. The average annual catch delivered to canneries has been about 9,850 mt in the 1980-84 period. Total domestic catch used for canning in 1984 was about 12,600 mt, reflecting the relatively large catch (3,700 mt) delivered by purse seiners. Total commercial catch declined in 1985 to 7,320 mt, of which 6,220 mt was delivered to canneries.

Most albacore is processed to canned white meat tuna. With the closure of most California canneries, three quarters of the processing is now concentrated in Puerto Rico canneries; most of the rest is canned in California. This poses a significant marketing problem for West Coast trollers, who either must accept a lower price for their catch, pay transshipment costs to operating canneries, or find alternate markets for their fish. The market for fresh and frozen albacore for home or restaurant consumption is not well developed although it has grown in recent years.

U.S. fishermen also must compete with other nations' fleets pursuing albacore. Japan's high seas gill net fishing fleet is the largest competitor, with increasing participation by Korean and Taiwanese vessels, in the north Pacific. Foreign-caught fish account for about one-half of the total production of canned albacore by U.S. canneries.

Recent evidence suggests that current north Pacific harvest levels are below the maximum sustainable yield (MSY) level. Therefore, increasing the U.S. harvest would not be expected to be to the detriment of the stock. The U.S. also is investigating the potential to increase its harvest by focusing on the south Pacific rather than the northern Pacific. In this context, it is important to note the need to improve the collection and exchange of fishery data among the several nations involved with the fishery.

There is a growing recreational fishery for albacore on the West Coast, both as an important seasonal target for southern California anglers and as an alternate or supplement to salmon fishing off the northwest. The economic value and importance of

this fishery is not known.

2. Management Objective

Expand the domestic harvest and processing of albacore from the Pacific Ocean by American commercial and recreational fishermen to 30,000 mt by 1995.

The key obstacle to achieving this goal for the short term is the lack of a reliable market for West Coast fishermen. As noted, cannery capacity has shrunk considerably, but markets for fresh and frozen albacore have not yet been developed, although they are growing. Improving the efficiency of fishermen by developing better predictors of the size and location of harvestable concentrations would be of limited value to fishermen without buyers for the fish harvested. For the longer term, additional obstacles include the inadequacy of data on abundance, distribution and migratory patterns of albacore; the lack of effective research and data collection and exchange mechanisms among the nations whose fleets pursue albacore; the need for good information on the effects of gear competition on catch rates by different gear types along the migratory routes of albacore.

3. Regional Strategy

The NMFS strategy is described in an "Operational Plan for NMFS Albacore Program" (NOAA Technical Memorandum SWFC-52, May, 1985), which was developed following a public workshop on long range planning for the north Pacific albacore fishery. The strategic plan includes (a) citizen participation to ensure sensitivity to the needs and aspirations of U.S. fishery participants; (b) international cooperation for research and data exchange to determine the status of stocks and effects of gear competition; (c) studies of the relationship between albacore and the environment to improve the ability to predict the movement of fish and enhance catch efficiency of domestic vessels; (d) exploratory fishing to determine the economic feasibility of a surface troll fishery for U.S. vessels in the south Pacific; (e) support of market development programs for fresh and frozen albacore landed by inshore fisheries on the West Coast; and (f) studies to improve the understanding of the value of the sport fishery for albacore.

4. Research Needs

High Priority

- Complete and disseminate guidelines and information (e.g., on-board brine preservation systems) to achieve high quality standards for fresh/frozen albacore.
- Continue to support market development efforts for fresh/frozen albacore and other non-traditional products.
- Compile industry and commercial data to assess potential solutions to high insurance cost problem.
- Continue fish tagging and other cooperative scientific work with the American Fishermen's Research Foundation.
- Expand work on use of satellite imagery data to improve information for U.S. vessels and enhance their efficiency.
- Expand cooperative international studies in South Pacific.
- Complete evaluation of economics of recreational fisheries for albacore.

Secondary Priority

- Develop model(s) to quantify the effects of gear competition.
- Develop environmental indices and determine statistical relationships between albacore catch and environmental factors.

8.0 - WEST COAST SALMON (MBO IV-1)

1. Description of the Fishery

Pacific salmon played a major role in social and economic development of the West Coast. Over the past century, salmon populations were reduced drastically by the cumulative effects of overfishing and widespread destruction of freshwater spawning, rearing and migrating habitats. This resulted in growing conflicts among competing users of a dwindling supply of an increasingly valuable resource.

Chinook salmon is the species of principal importance to the Southwest Region. Chinook generally migrate north, often thousands of miles, along the West Coast as juveniles, returning south towards natal streams as they mature. The ocean population is a composite of intermingled weak and strong, hatchery and natural components subject to numerous competing fisheries. California chinook are caught as far north as central Washington; most are caught off California and southern Oregon. The entire ocean catch is landed with trolling gear. Small numbers are caught incidentally by U.S. and foreign trawler fleets.

Current recreational and commercial harvests have been reduced about two-thirds from earlier levels. Even in this depressed state, the ex-vessel value of the 1985 West Coast non-Indian troll harvest was nearly \$20 million.

2. Management Objective

Manage West Coast salmon and steelhead resources to achieve escapement goals and increased harvest by 1999.

A key obstacle to this goal is that the salmon resources of Washington, Oregon, California and Idaho are managed under one variety of programs, while habitat is largely managed by a different set of agencies. Harvest is managed in offshore waters by the Pacific Fishery Management Council (PFMC) and the North Pacific Fishery Management Council, and some tribal regulations; within state boundaries by state and Indian tribal regulations; and within international boundaries by a new U.S.-Canada Salmon Commission. Habitat is managed or affected by the management programs of state and federal agencies, including the Army Corps of Engineers (COE), Bureau of Reclamation, Federal Energy Regulatory Commission, and U.S. Forest Service. Coordination of efforts is critical to restore salmon populations for optimum productivity.

Decreasing chinook stocks are caused by an over-harvest, loss of spawning, rearing and migrating habitat and poor environmental conditions. The technical capability exists for achieving more than two-fold increase in production; potential economics and social stability rewards would be considerable.

To increase a harvestable resource, NMFS will address research and development, habitat conservation, hatchery operations, harvest allocation/regulation and enforcement.

Research and development programs provide means of understanding adult and juvenile fish habitat requirements and migrating behaviors. New information on salmon habitat and migration then can be applied to anadromous streams and to in-water activities that interfere with freshwater migrations. Research and development can interpret genetic significance and provide means of preserving natural selection processes. Hatchery production is intended to produce stocks compatible with natural stocks, receiving streams and the needs of commercial and recreational harvesters.

The NMFS participates on interagency task forces to identify and resolve habitat issues; results are slow in coming, but progress is being made. Problems include: (1) continued in-river development and the reluctance of water users to incur increased project costs and fully protect anadromous fish, (2) the inability to demonstrate the full economic value (importance) of the resource, (3) the inability to accurately assess adult spawning escapement in important river systems and individual stocks in the oceanic life phase, and (4) the inability to conclusively describe individual and cumulative impacts of adverse habitat modifications.

3. Regional Strategy

Our approach is to manage salmon harvests at safe levels while working to protect and restore salmon spawning and rearing habitat in rivers and estuaries.

To accomplish this the NMFS will:

1. Cooperate with the PFMC, the NMFS and the states to regulate salmon fisheries to achieve the greatest possible long-term benefits.

2. Continue to advise federal and state construction agencies (COE, Bureau of Reclamation, Federal Energy Regulatory Commission, California Department of Water Resources) regarding measures needed to preserve salmon habitat. Early consultation

is essential since the costs of modifying construction or operational plans must be considered in initial benefit/cost calculations early enough to provide fish protective measures; often benefit/cost estimates are completed before expensive fish protective measures are considered. Tighter budget constraints generally support economic development (e.g., out-of-stream water uses such as hydro-power and irrigation) and discourage activities that inhibit favorable benefit/cost estimates (e.g., fish protective measures).

3. Determine the economic value of Sacramento River chinook salmon and the instream upon which they depend. The NMFS is performing a contractual study to determine these values. The information will be a precedent-setting measure by placing fishery interests on a competitive negotiating level with other water users. This was coordinated closely with the Southwest Fisheries Center (SWC) economic analysis staff. Although a short-term problem, the information will not be available for two years.

4. Continue to encourage and advise California Department of Fish and Game (CDFG) as they proceed to obtain important spawning escapement data.

5. Advise the PPMC on salmon habitat issues. This was implemented recently, but tighter travel budgets could reduce interagency and NMFS/PPMC coordination.

6. Continue vigorous enforcement of salmon harvest regulations. The assistance of the U.S. Coast Guard, state agencies and Indian tribes is essential to assist NMFS staff in enforcing regulations. The NMFS must assure that these agencies are informed of current regulations and trained in fish and fishing gear identification and federal law enforcement procedures.

7. Continue interagency negotiations to resolve major project-induced salmon mortalities. These negotiations include: (1) safe downstream passage past the Red Bluff Diversion Dam, (2) fish protective measures for Lake Redding and Lake Red Bluff hydropower proposals, (3) habitat restoration in the Trinity River Basin, (4) protecting riparian habitat along the upper Sacramento River streambanks and (5) identifying adequate freshwater and estuarine flow needs. The Southwest Region (SWR), SWC and CDFG are attempting to assess the feasibility of a commercial fishery for Sacramento River squawfish to reduce predator mortalities on juvenile salmon.

4. Research Needs

High Priority

- Determine ocean distribution of salmon stocks to allow selective harvest of stronger stocks while protecting weaker stocks.
- Assess water diversions in the Sacramento River and Delta. All diversions should be inventoried to identify and record the type of each diversion, type and condition of fish screens and recommendations for optional improvement measures.
- Evaluate fish protective measures installed or applied by developers to assure proper installation/operation. This also will measure the effectiveness of our own recommendations so that we can improve as we proceed.
- Improve hatchery design and operation. Present hatchery production at Trinity and Coleman hatcheries can be improved considerably by applying new quality control measures through hatchery modification. More improvement is needed to detect early disease symptoms, better disease control and improved release schedules.
- Determine habitat requirements of juvenile fish. Too little is known concerning the importance of shallow estuary areas to smolting/rearing fish, the negative (or positive) interaction between young salmon and man-made structures (vertical bulkheads, deep shading, increased marina basins, deeper river channels, etc.). For example, we cannot predict juvenile salmon behavior (other than residence time) from the time the small fish enters San Pablo Bay to the time it leaves the Golden Gate.
- Measure cumulative impacts of several non-significant adverse impacts. Dealing with case-by-case issues, only individually significant impacts are assessed. It may not be unreasonable to assume that multiple, small-scale impacts could collectively exceed the individual impact of some large project being examined.
- Assess the importance of spawning gravel supplies in the upper Sacramento River. We believe that erosion protection measures are eliminating natural recruitment of gravel into the river. A contractual study, proposed to assess the significance of this problem, will be coordinated with the SWC.

Much of the information needed is beyond the present scope of SWR/SWC activities. Findings by Northwest and Alaska Fisheries Center and other researchers will be applied as appropriate to California salmon resource and habitat management as it becomes available.

III. NMFS SOUTHWEST REGION - STRATEGIC PLAN

THE SOUTHWEST REGIONAL SITUATIONa. THE RESOURCE

1. HABITAT: The Southwest region includes California, Arizona, Nevada, Hawaii, Guam, American Samoa, the Northern Mariana Islands, and, pending resolution of the Compact of Free Associations issue, the Trust Territory of the Pacific Islands. The waters of the U.S. fishery conservation zone (FCZ) off these affected land areas are composed of three distinct climatic regimes. Northern and central California tend toward sub-arctic conditions characterized by cold, productive waters supporting large populations of demersal and anadromous fishes related to similar species found further north in Oregon, Washington and southern Alaska. The Southern California Bight, from Pt. Conception southward, is an area of warmer water and less persistent upwelling where warm water pelagic species dominate. The third regime is the area surrounding the tropical and subtropical islands of the central and western Pacific characterized by pelagic species and a wide diversity of reef fishes.

Habitat critical to the living marine resources in the Southwest region varies between mainland and island areas. The coast of California has a narrow continental shelf with one major natural estuary, San Francisco Bay and delta. Minor estuaries occur in northern California and in some Pacific island areas. The island areas have a volcanic geological history and numerous fragile reefs and lagoons.

California has experienced extraordinary population growth and associated development since World War II. Most of this growth has occurred within 50 miles of the coast or major rivers. As a result, a considerable portion of California's fishery habitat important to marine and anadromous species has been physically removed or altered for industrial, municipal, and residential expansion. In southern California, a large proportion of the coastal wetlands has diminished. One estimate is that over 90 percent of historical state wetlands have been lost. One of the largest remaining restorable wetlands, Bolsa Chica in Orange County, is under threat of development.

In some parts of northern California, pollutants, blocked streams, and freshwater diversions have greatly reduced historical populations of salmon and striped bass.

Similar development pressures are at work in the islands. Unfortunately, the fragile coral reef habitat may be more vulnerable and less able to recover than some of the mainland habitat. Some unique areas have been protected, such as the Pt. Reyes/Farallon Island areas off San Francisco Bay, the Channel Islands, Elkhorn

Slough, and Tijuana Estuary. In the Pacific islands, in addition to nuclear testing and waste disposal, we are concerned about the potential effects of ocean thermal energy conversion (OTEC) and deep seabed mining on living marine resources and their habitat.

are they full?

On the mainland, there are continuing development pressures on remaining habitat: port development, diversion of freshwater from northern to central and southern California, increased OCS lease sales and related activities, and increased ocean (deep water) dumping of sewage and low/level radioactive waste.

As serious as these problems and threats are, the region again reports a net gain in available fishery habitat associated with Federal permit actions attributed in part to the use of its operational habitat protection policy. Continued population growth and coastal development will make it increasingly difficult to maintain the positive net change in the future.

2. PROTECTED SPECIES: Most of the great whale species migrate along the California coast; several species occur in Hawaiian waters. Humpback whales winter in shallow waters around the main Hawaiian Islands where they calve and nurse their young. The number of whale watching vessels has increased and so has concern for harassment of the whales. Harassment may be approaching levels that could affect the distribution of whales or affect the reproduction potential of populations. The region has published guidelines for whale watching in California and a Notice of Interpretation to define better the activities that will be interpreted as harassment.

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Several small toothed cetacean and pinniped species inhabit the coastal waters of California and central and western Pacific islands. Some of these are involved in interactions with commercial fisheries. At least three delphinid species take bait and hooked fish from handlines and longlines in Hawaii. Two species of pinnipeds and at least two delphinid species are killed incidentally in commercial fishing operations in California. The California sea lion is the most troublesome species. In most coastal fisheries it is either incidentally killed or it is a direct competitor for commercial species of fish. The NMFS is cooperating with the California Department of Fish and Game (CDFG) to develop non-lethal means of mitigating these problems. The State of California has notified the NMFS that it will not pursue transfer of marine mammal management authority from the Federal government at this time.

Other concerns involving coastal marine mammals include effects of habitat degradation from OCS development and coastal construction. The region coordinates with Federal, state, and local government agencies to ensure the effects of development and construction on marine mammal populations are considered in planning these activities.

*Amel
Seamind.*

The endangered Hawaiian monk seal is threatened by increased commercial fishing along the Northwestern Hawaiian Islands (NWHI). The NMFS has implemented a recovery plan that describes the strategy for developing the necessary information for assessing the impact of human activities on the monk seal population. The NMFS proposed to designate portions of the NWHI as critical habitat for monk seals as part of the recovery plan. The plan also outlines how the NWHI can be used so the monk seal population can recover. The green sea turtle nests in the NWHI and feeds around the main Hawaiian Islands. Its nesting beaches are protected but could be affected by increased use of the NWHI. Its feeding areas are subject to degradation from coastal construction projects. The NMFS coordinates with the Corps of Engineers (COE) to encourage conservation of existing habitat.

Several species of delphinids were affected by the fishery for yellowfin tuna. Incidental mortality resulted in a decline in some delphinid population levels, in particular the eastern spinner population and the offshore spotted population. The NMFS administers the management program that provides for the recovery of porpoise stocks and the continued operation of the yellowfin tuna fleet. The current allowable levels of porpoise mortalities have been extended indefinitely by Congress. The NMFS is reviewing porpoise saving regulations which apply to the tuna fleet with the intent of strengthening the most effective regulations.

3. FISHERY STOCKS: Major fishery resources within the region include the tunas (skipjack, yellowfin, albacore) and billfishes; coastal pelagics (squid, anchovy, Pacific and jack mackerels, bonito, sardine); and anadromous and other neritic species such as salmon, spiny lobster, pink shrimp, Dungeness crab, and groundfish. In the warmer waters south of California such species as sea bass, barracuda, and yellowtail are important to marine anglers as well as commercial fishermen.

Landings in the region by domestic fishing vessels in 1983 contributed approximately 370,000 metric tons of fish to the world supply at an exvessel value of about \$333 million. Foreign catches in the FCZ and joint venture catches added a small amount. A majority of the domestic fish catch was destined for human consumption in the U.S. However, export markets also exist for sablefish, squid, sea urchin, herring roe, and salmon.

There are indications that yellowfin tuna in the eastern tropical Pacific ocean may be susceptible to overfishing and must be continually monitored to avoid declining yields from that species. Some California chinook salmon stocks show signs of being depressed. Although 1982 was a record year for chinook landings, 1983 and 1984 were extremely poor for salmon fishing success off

northern California due in part to the 1982-83 "El Nino." The Pacific sardine and Pacific mackerel populations, which have been depressed for many years, are now showing signs of recovery after several years' moratorium on commercial harvest. Pacific whiting, sea urchins, rockfish, and shark landings have been increasing.

Some development potential may exist in shortbelly rockfish, Pacific whiting, jack mackerel, saury, squid, and possibly anchovy. The whiting stocks are partially exploited by foreign trawlers and joint ventures and only slightly exploited by U.S. trawlers fishing for U.S. processors. Under full exploitation by the U.S. industry, this species might support combined annual landings in California exceeding 100,000 metric tons.

Three fisheries in the region are undergoing changes which make restructuring of the fishery a distinct possibility. First, the tuna fishery in San Diego has been the largest in the region and one of the largest in the country. During the past three years, all of the tuna canneries in San Diego have closed operation with no intention of reopening. In 1984, the Star-Kist cannery on Terminal Island quit packing tuna, leaving only one tuna cannery along the coast. The major canners moved their operations to Puerto Rico and Samoa apparently to reduce costs. While many vessels continue to be based in San Diego, others have moved to Panama and the western Pacific.

A second fishery undergoing change is the northern anchovy fishery. In this fishery the problems are a weak fish meal and oil market and an expanding Mexican fishery on the transboundary stock. So far, there has been no progress in discussing or developing plans for joint management of the fishery.

The highly migratory stock of north Pacific albacore is exploited by several nations, including principally the U.S. and Japan. The fish are harvested by the live bait method, longlining, trolling, and gillnetting. Japanese gillnetting in particular is increasing in the central and western Pacific. Total landings have increased while catch per unit of effort has decreased, indicating a possible conservation and management problem needing international management consideration.

b. THE INDUSTRY

1. DOMESTIC: The diversity of the fisheries in the region give rise to an equal variety of management concerns. The distant water tropical tuna fishery employing high technology, for example, differs dramatically from the handline rockfish fishery of southern California. Both also differ from the anchovy fishery, which is shared with a growing Mexican fleet, and from the Indian subsistence

salmon fishery in northern California. In addition, the fisheries of the Pacific island areas consist of low volume harvests of a wide variety of species for a high quality market such as in Hawaii, low volume harvests by many very small vessels for local consumption, and a relatively large subsistence catch. The division between commercial, recreational, and subsistence fisheries is often ill-defined in the western Pacific.

The recreational fishing industry, which supplies goods and services to recreational fishermen, exerts a strong influence on local economies in California. Add to that the number of sportfishermen and the significance of this interest group, both politically and economically, is clear.

Until 1980 most fisheries were able to expand their fleet. Expansion ended in a slump in vessel construction from 1980 to the present. High interest rates and sluggish exvessel fish prices have contributed to the slowing of new entries into the fisheries. However, a return to persistent growth may be seen if interest rates decrease and the economy resumes its growth.

The West Coast trawl fishery will continue to have an excess of harvesting capacity. Many of the large midwater trawl vessels participate in the Pacific whiting joint venture fishery. If joint ventures are terminated some of the trawlers will turn to bottomfishing, putting additional pressure on stocks that are already fished heavily by smaller, local vessels. New fishing opportunities for the midwater trawlers appear limited at present.

2. FOREIGN INVOLVEMENT: There are a variety of foreign involvements in fisheries in this region. In addition to the small scale fishing by the Japanese in the seamount fishery and a Pacific whiting joint venture with the USSR, more complex and unique relationships exist in the western Pacific where foreign vessels deliver their catches directly to island buyers. Probably the most strained relationship is that with Mexico. Mexico has been unwilling to negotiate management agreements for shared coastal pelagic stocks and has occasionally seized U.S. tuna vessels.

c. THE MARKET

1. DOMESTIC: It has been estimated that Californians consume approximately 15 percent of all seafood consumed in the United States. Therefore, much of what is produced in the state is also marketed in the state. In addition, a significant amount of Alaska's and the Northwest's fishery production is marketed in California through San Francisco and Los Angeles brokers.

Some California products are marketed nationwide and worldwide, such as tuna, squid and salmon. California groundfish is still largely consumed within the State. However, marketing promotion through foundations and other organizations has helped to establish and expand groundfish markets in the midwest.

Central and western Pacific island fisheries, other than tuna, are local in nature. With the exception of some shrimp and lobster, most locally caught island seafood products are marketed and consumed locally.

Most of the tuna caught and canned in the central and western Pacific is marketed in the mainland United States.

2. IMPORT-EXPORT: Over five million pounds per week of imported fishery products enter the United States through California ports. San Francisco and Los Angeles are major centers of distribution for imported products.

Exported California products include herring roe, sea urchins, fresh/frozen salmon products, squid, and some crayfish. Export market development for other California products, such as mackerel, Pacific whiting and some groundfish species is ongoing.

d. ISSUES & NEEDS

Tuna - The U.S. tuna fishing fleet is well established in the western Pacific. The tuna industry has negotiated interim access arrangements for U.S. vessels to fish in the waters throughout the south Pacific region. However, the NMFS should be prepared to work towards a long-term regional treaty that would provide U.S. tuna fishing access in all the Trust Territory. One way to facilitate the establishment of a treaty would be for the NMFS to carry out fishery resource surveys of the region under the purview of a comprehensive multilateral arrangement with both coastal state and distant water fishing nations. Fishery resources surveys that are conducted from the NOAA ship TOWNSEND CROMWELL could be extended under such an arrangement. This might help ensure that a prime tuna fishing area, roughly the size of the U.S. mainland, would be legally accessible to U.S. fishermen on a long-term basis.

The United States will continue to be involved in international efforts to manage the Pacific tropical tunas. Mexico and Costa Rica withdrew from the IATTC in 1978 and 1979, respectively, and Canada announced its intent to withdraw, effective May 17, 1984, in May 1983. Recently, however, Costa Rica, Guatemala, Honduras, Panama, and the United States signed the new Eastern Pacific Ocean Tuna Fishing Agreement. This Agreement provides for the orderly harvest of tuna and for negotiations

toward a new international organization to manage tuna. Other countries are expected to sign the Agreement or indicate interest in the near future. The Agreement will become effective upon ratification by five coastal countries. The U.S. Senate approved the Agreement in July 1983.

As a priority, the U.S. government needs to establish a legal authority to obtain fishery data from U.S. fishermen if the NMFS is to participate fully in any regional conservation and management program for highly migratory tunas. In the interim, the NMFS needs to continue to strengthen its relationships with tuna scientists throughout the Pacific in order to improve stock assessments and other scientific analyses on a cooperative basis in preparation for more formal international arrangements.

The albacore catches by Japan, the U.S., and Canada (the three major fishing countries) in recent years may be at or near maximum sustainable yield for the species. Continued expansion of the Japanese and U.S. fishing effort is predicted even with the continuing decline in the catch-per-unit effort. If these trends continue, the establishment of an international agreement for controlling the catch should be considered. The NMFS will continue to monitor the status of the albacore stock and will continue to strengthen international scientific efforts by holding meetings of international scientists to assess the condition of the albacore stocks annually.

U.S.-MEXICO: The California coastal pelagic resources are fished off Mexico as well as California. This raises a problem because the Mexican fishermen are not regulated as are U.S. fishermen. There is considerable concern within the region that lack of a management agreement with Mexico will jeopardize anchovy and other important coastal stocks.

ALLOCATION OF FISHING RIGHTS: Direct and indirect allocation of fishing rights among users of many fish resources in the region is becoming necessary. In traditional groundfish fisheries questions have been raised recently regarding the allocation effects of such measures as quotas (daily and annual), seasons, size limits, and area closures. These indirect allocations redistribute rights between recreational and commercial fishermen, big and small vessels, and among various types of fishing gear. The state of California has instituted limited entry programs for several marine and anadromous fisheries and interest is growing to include more commercial fisheries under some form of limited entry.

COASTAL MARINE MAMMAL/FISHERY INTERACTION: The number of problems with marine mammals is increasing in the region. Porpoise in Hawaii and sea lions in California are most commonly encountered by fishermen, resulting in loss of catch, gear, and time for the fisherman and injury or death for the mammal. Charter vessel operators are seeking legal

means to reduce interference by marine mammals as well. Conservation and wildlife protection interests have been urging more stringent controls on commercial fishermen's use of force on marine mammals and have supported vigorous enforcement of the Marine Mammal Protection Act.

SEA TURTLES: The region is leading a joint NPS and FWS effort to establish a sea turtle recovery team to identify action that will lead to the recovery of sea turtle populations and their eventual delisting.

HAWAIIAN MONK SEAL: Implementation of the recovery plan for the endangered monk seal is a high priority. Expansion of fishing activities in the NWHI causes new concern for protecting this species and a formal designation of critical habitat for monk seals has been proposed.

CALIFORNIA WATER DIVERSIONS: The region carefully analyzes proposed water projects and comments on those which would affect anadromous fish stocks. There will continue to be great pressure to transfer water from northern to southern California for agriculture.

COASTAL & ESTUARINE HABITAT: Through the COE permit process, the region has sought mitigation for construction projects which degrade the habitat value. Some forms of mitigation used include project modifications, restoration of historic wetlands and shallow water habitat creation.

*Artificial
reps?*

OPEC & OIL DRILLING: The use of nearshore areas for oil exploration and production causes concern over potential damage to marine animals and habitat due to oil spills. Conflicts arise when fishermen's gear is damaged by oil survey vessels and obstructions on the bottom. To reduce losses, fishermen avoid the vicinity of oil drilling sites, sacrificing some fishing areas which were productive in the past. In the western Pacific ocean, thermal energy conversion development has the potential for conflicts with other oceans users, including fishermen.

III-1 WEST COAST GROUND-FISH FISHERY

OBJECTIVE: Maintain and manage the West Coast groundfish fishery at optimum yield (OY) and achieve exclusive harvest and processing by U.S. commercial and recreational fishermen and processors by 1995.

RESOURCES REQUIRED

Funds (\$K)
Staff Years (FTE)

FY 1986

FY 1987
Obligations Outlays

SIGNIFICANCE:

The domestic commercial groundfish fishery harvest tripled from 60,000 metric tons (mt) in 1977 to 180,000 mt in 1982, then declined slightly to 170,000 mt in 1983 and 1984. The estimated exvessel value of domestic commercial catch was \$60 million in 1984. Domestic shoreside landings increased from 55,000 mt in 1977 to a peak of 119,000 mt in 1982, but declined to 90,000 mt by 1984. However, domestic harvests in joint ventures with foreign processing vessels increased from zero in 1977 to 80,000 mt in 1984. Directed foreign harvests decreased from 255,000 mt in 1976 to zero in 1982, with a slight rise to 15,000 mt in 1984 after the embargoes on Polish and Soviet fishing were lifted. The number of trawl vessels in the domestic fishery increased from 280 in 1976 to 430 in 1984, and the use of other gear (especially gillnet) has grown substantially in some areas. There is far more capacity than is necessary to harvest traditional species, most of which are fully utilized. Fishing for Pacific ocean perch, sablefish, widow rockfish and the Sebastes complex is tightly controlled to prevent overfishing and/or to rebuild the stocks. A few species such as Pacific whiting, shortbelly rockfish and jack mackerel are underutilized. In part, this reflects that the processing sector has not developed as fast as the harvesting sector due to the high cost and risk of product development and promotion to establish markets for domestically processed whiting, shortbelly rockfish, and other species. There also is limited access to foreign markets for such products, further hampering development of the domestic processing sector, especially for non-traditional species.

The groundfish fishery is managed by a framework FMP involving between-season and in-season adjustments which require that accurate and timely stock assessments and fishery data be available for such decisions. Careful coordination of management actions among Federal and state agencies is necessary due to the inter-jurisdictional nature of the fishery. An active enforcement presence is necessary to ensure compliance with the management regime. Some species in the groundfish complex are estuarine dependent, and efforts are needed to ensure that land and water uses do not affect adversely the productivity of these estuaries. Different management approaches need to be evaluated to control overall fishing capacity in a rational and cost-effective manner while promoting full use of non-traditional species. Financial assistance for vessel owners needs to be tightly focused to ensure that additional stress is not placed on fully utilized stocks, and S-K grants should emphasize enhancing the marketability of underutilized stocks.

METHOD OF ACCOMPLISHMENT:

The NMFS will work with state agencies to conduct resource surveys and update annual status of stock reports for the most important species to support the council's annual management decision cycle. Methods will be developed to predict year-class strength and recruitment for these species. The interaction of the fishing with harbor porpoise will be assessed and allowable levels for incidental take in the gillnet fishery off California will be established. The NMFS and states will continue to cooperate in compiling and reporting landing data via PacFin. An effective port sampling program data base will be established to provide the data necessary for in-season projections of catch for quota species or species groups on a timely basis. An annual review of the economic status of the fishery will be prepared. A comprehensive limited entry study will be initiated.

The NMFS and states will cooperate through the council in making and implementing the annual and in-season management decisions, including assessment of domestic, joint venture and foreign fishing operations to determine appropriate allocations for 1986. State grant project reports will be reviewed to determine if objectives were met. The NMFS will develop habitat evaluation criteria for estuarine-dependent groundfish for use in review of land and water use plans and in conditioning Corps of Engineers permits. The NMFS, Coast Guard and states will continue cooperative enforcement of the groundfish regulations.

A limited financial assistance program to assist financially troubled borrowers to remain viable will be administered. The NMFS will support projects to develop recommended methods for handling, preserving and processing various groundfish species to improve product quality and safety. The feasibility of using groundfish in non-traditional products forms also will be evaluated; and through coordination between industry and the government, new export markets for traditional and non-traditional species are being identified through sales events, trade shows and government-to-government negotiations.

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III-2 COASTAL PELAGIC FISHERIES

OBJECTIVE: Manage coastal pelagic fisheries at OY and achieve maximum harvest and utilization by U.S. commercial and recreational industry by 1995.

<u>RESOURCES REQUIRED</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>Outlays</u>
	<u>Obligations</u>		

Funds (\$K)
Staff Years (FTE)

SIGNIFICANCE: MBO

Domestic fisheries for coastal pelagic species (mackerels, anchovy, squid, and bonito) have a total potential harvest in excess of 400,000 mt per year with an exvessel value of more than \$60 million. These fisheries, however, are currently far short of this maximum potential. Total exvessel revenues have fallen almost 50 percent (from \$22.9 million to \$12.2 million) since 1981 and are about 25 percent below the 1978-82 average (\$16.3 million). Large fluctuations in resource abundance and availability and in market conditions are the most significant impediments to achieving maximum commercial benefit from these fisheries.

In addition to their commercial importance, the coastal pelagic species serve growing marine recreational fisheries which annually spend more than \$40 million in southern California. Anchovy is a primary forage species for popular game fish, and charter boat operators specifically search for anchovy schools. Anchovy also is commonly used as live bait, and fishing for anchovy and squid for use as bait generates an estimated \$20 million per year. Pacific mackerel and bonito are among the five most frequently caught species by sport fishers.

Achieving the long-term potential from the coastal pelagic fisheries will require careful consideration of a wide range of biological, economic and management issues. The anchovy fishery is the only one of these fisheries managed under a FMP. Since most commercial vessels harvesting anchovy also fish for the other coastal pelagics, management of all these species as a unit may be better suited to the complex interactions among the species, fishermen, and conservation issues involved.

Management of coastal pelagic fisheries is complicated also by the fact that the species involved range between U.S. and Mexican jurisdictions. The Government of Mexico is strongly promoting development of its coastal fisheries but has shown little interest in cooperative management. Another complicating factor is the seals and sea lions interfere with a variety of commercial and recreational fishing activities.

Other major problems facing the fisheries are the lack of steady markets and resource availability. While demand for anchovy products (meal, oil, solubles) has weakened in recent years in the face of competing alternatives (e.g., soybeans), increased demand for market squid has not been met by California fishermen.

Squid landings fell almost 80 percent last year because of the virtual disappearance of the resource from the usual fishing grounds. This may be attributed to the "El Nino" oceanographic conditions of 1982 and 1983. Meanwhile, coastal pelagic fishermen have been sustained by mackerel harvests which have a market as a canned product for human consumption and as pet food.

METHOD OF ACCOMPLISHMENT:

Development and use of the egg production method for determining anchovy spawning biomass has simplified and greatly reduced the cost of the annual determination of optimum yield and quotas under the FMP. Other changes in the FMP improve the potential for the commercial fishery to take its full quota. Completion of a management information document will provide a basis for deciding whether a multi-species management program is necessary and feasible, either through the Pacific Council or the State/Federal program. The annual economic status report will provide a record which can be used to assess the effectiveness of management from year to year. Efforts to establish a mechanism for data exchange with the Government of Mexico will continue.

Current market prices for non-traditional fishery products are relatively low. Frozen mackerel fillets are being test-marketed, and other mackerel product forms are being developed for test marketing domestically. The identification of new export markets for other species is occurring through government and industry participation in sales missions, trade shows, and negotiations.

The status of coastal marine mammal stocks is being assessed in cooperation with the California Department of Fish and Game. Methods to mitigate effects of the interactions of marine mammals with coastal pelagic fisheries (commercial, charter, and recreational) are being tested.

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III-3 INSULAR FISHERIES

OBJECTIVE: Manage U.S. Pacific Islands' fisheries at OY while maintaining artisanal and subsistence fisheries

RESOURCES REQUIRED

Funds (SK)
Staff Years (PTE)

SIGNIFICANCE: MBO

	<u>FY 1986</u>	<u>FY 1987</u>
	<u>Obligations</u>	<u>Outlays</u>

While relatively small in total landed value, the value of Pacific island fisheries on a per capita basis equals or exceeds the value of landings in many mainland States, and effort, landings and value have increased in recent years. More offshore fishing grounds are being exploited by new, larger vessels, some of which have moved to the central and western Pacific from depressed West Coast and Alaska fisheries. Most nearshore fish stocks in Hawaii, American Samoa, Guam, and the Northern Marianas are fully exploited by commercial, recreational and artisanal fishermen. However, stocks of offshore pelagics, bottomfish, and crustaceans offer substantial opportunity for increased harvests. Among the species of primary interest are deepwater bottomfish (opakapaka, onaga, ehu); shallow water snappers (uku, taape); reef predators (giant ulua, pig ulua); and deepwater shrimp and spiny lobster. Seamount species such as pelagic armorhead and alfonsoin also offer substantial opportunity if the stock decline of the past decade can be reversed.

The Pacific Basin Development Council, a regional executive council composed of the governors of the U.S. Pacific islands, has identified fisheries as the primary priority for economic development. They view fisheries as one of the few resource bases available for economic development to improve income of local inhabitants, diversify their economies, and reduce their dependency on shipments of goods and services from the mainland and from other countries. Each island government has prepared a fishery development plan, and these plans have been merged into a Central and Western Pacific Regional Fishery Development plan which identifies shared development goals and needs. To the extent resources will allow, the island people seeking to achieve self-sufficiency in fisheries and to substitute local harvest for imports or shipments from the U.S. mainland.

The development of island fisheries will involve balancing economic growth with biological limits and cultural needs. The island governments acknowledge that coastal reef fishing resources are limited, and that uncoordinated and uncontrolled growth and new entries in the fisheries could quickly deplete stocks and disrupt established local fisheries. Significant increases in fishery production in the various island fisheries will have to come from a larger fishing fleet which can operate in remote reaches of the island

resource surveys and collect additional biological and socio-economic data. Other needs include improved infrastructure facilities such as docks, ice houses, and storage and transshipment facilities; better product handling technology and market development. The latter appears especially important so that local markets will not be severely disrupted by occasional large deliveries of products by the new, larger vessels.

Fisheries management in this context is viewed as a mechanism to maintain stability in current fisheries, to promote efficiency and prevent overcapitalization in new fisheries, and to collect and disseminate information to prospective fishery participants. Management and development approaches suitable for the mainland could be disruptive and ineffective in island communities in which small-scale commercial and artisanal fisheries account for a large portion of local fishery production and in which per capita rates of seafood consumption are more than twice as high as for the mainland U.S. The technology to harvest, process, and transship offshore and distant water fish resources is available, but the ability to transfer and apply this technology is hampered by the long distances involved and sometimes unreliable transportation and communication systems. Enforcement is difficult due to the large area under U.S. jurisdiction and the limited resources available to the NMFS and the Coast Guard.

METHOD OF ACCOMPLISHMENT:

Based on the results of two recently concluded programs, the distribution and estimated maximum sustainable yields of important insular resources in the Hawaiian Archipelago and the Mariana Archipelago have been determined, and reports and publications, presently the results of these assessments, have been published. The results have been disseminated to fishermen and agencies involved with fishery development in these areas. Over the next several years the focus will be to use the results of these assessment surveys to aid the development of fisheries in these areas and to undertake detailed stock monitoring and assessment based on commercial and research data as development of the fishery proceeds. Of particular assessment focus will be seamount resources and lobster and bottomfishes in the Hawaiian Archipelago.

The Central and Western Pacific Regional Fishery Development Plan identifies development needs and problems common to most island areas. The plan will be used to guide public and private investments in infrastructure and support services, including awards under the Saltonstall-Kennedy grant programs. In addition, the NMFS has entered into an agreement with the Economic Development Administration (EDA) to provide technical engineering and contract administration oversight for infrastructure projects.

Current management and development approaches will continue as warranted. Data collection and exchange agreements have been signed with several island governments to ensure the capability to monitor catch, effort, and fishery values over time. NMFS' P.L. 88-309 grant funds are being channelled to data projects to support this objective in some areas. These data will be used to prepare the annual report required under the Spiny Lobster FMP, and to assist the Western Pacific Fishery Management Council in completing management plans (if needed) for Pacific billfish and game fishes, bottomfish, and deep sea shrimp.

The data also are necessary to prepare annual economic status reports which provide a record of progress from year to year. An annual schedule of cooperative enforcement patrols will be developed with the U.S. Coast Guard to monitor compliance of foreign vessels, and domestic lobster landings will be inspected to monitor compliance with the FMP. The NMFS will provide policy guidance and technical assistance through 1985 to Trust Territory governments in establishing fishery development and management programs consistent with the sound conservation principles of the Magnuson Act and to guide grant-in-aid decisions under P.L. 88-309 and the S-K program.

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OBJECTIVE: Manage protected species to achieve the optimum population levels for delisting, while permitting associated commercial and recreational fisheries to continue.

	<u>FY 1986</u>	<u>FY 1987</u>
<u>RESOURCES REQUIRED</u>	<u>Obligations</u>	<u>Outlays</u>

Funds (\$K)
Staff Years (FTE)

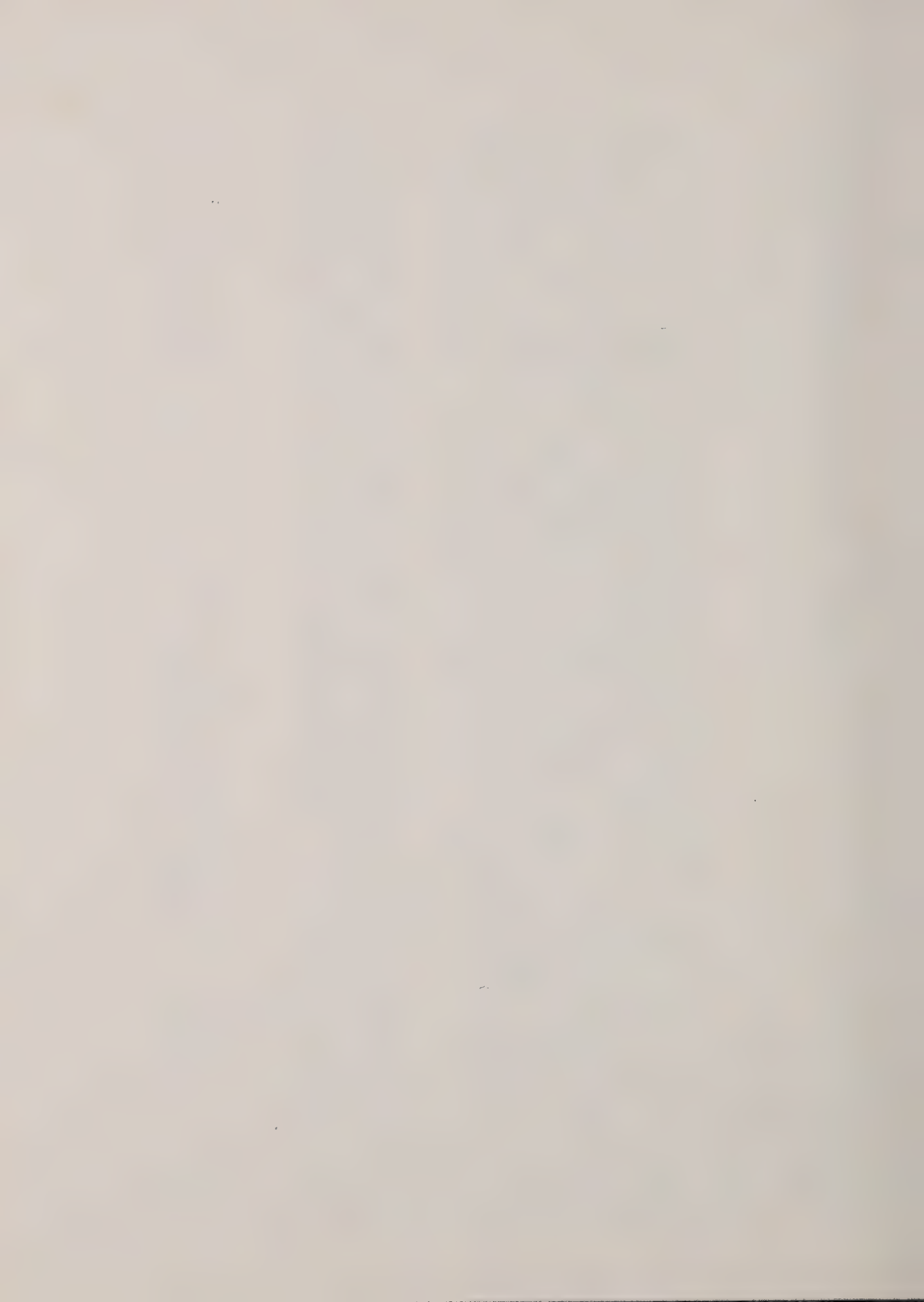
SIGNIFICANCE: MJO

Many species protected under the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) are found in the Southwest Region, including gray whales and coastal pinnipeds off California; porpoise in the eastern tropical Pacific (ETP); and humpback whales, Hawaiian monk seals and several species of marine turtles in the central and western Pacific. The gray whale population has recovered to 17,000 whales. Increasing levels of disturbance and habitat degradation are continuing threats in need of management. Coastal marine mammal populations have increased, such that conflicts with commercial and recreational fisheries off California are increasing. Porpoise stocks incidentally taken in the ETP tuna fishery are stable or increasing, but continued regulation of incidental take and additional study of stock abundance is necessary. Hawaiian monk seal and sea turtle populations are stable at low numbers. No trends in population growth are apparent as the result of recovery actions implemented since 1983. Humpback whales are also threatened by increasing levels of disturbance and habitat degradation. The north Pacific population is estimated at 1,200 whales, but no recent information on trends in population growth is available.

Continued monitoring of protected species population levels and status is critical to measure the effectiveness of protective actions and to determine the need for future actions and the potential for delisting. With sufficient information on the needs of these species, agencies can modify projects incorporate into their plans project modification and implement protective measures which will eliminate threats to protected species. A strong enforcement presence is needed to ensure effective administration of and compliance with regulations.

METHOD OF ACCOMPLISHMENT:

Programs are in place or being developed under which the NMFS will continue to protect and promote the recovery of endangered and threatened species and marine mammal populations. Whale watching tours for gray whales will be monitored to assess the effectiveness of current guidelines. The NMFS contract for cooperative enforcement of MMPA regulations with the California Department of Fish and Game will be extended.



The NMFS will continue to work with Federal agencies and other organizations to grant, and monitor activities under permits allowing marine mammal takings for public display or research or incidental to fishing and other activities.

Regulations governing incidental taking of porpoise in the FLP tuna fishery will be amended to provide more flexibility for use of porpoise rescue gear and procedures while limiting total mortality under MMPA quota limits. The NMFS will continue to place observers aboard purse seine vessels to monitor porpoise mortality. The NMFS also will initiate a program to monitor the trends in abundance of porpoise populations. The Hawaiian monk seal recovery plan approved in 1983 will be implemented further, and critical habitat will be designated for this species to provide additional protection. A recovery plan will be developed for sea turtles in cooperation with the Fish and Wildlife Service. The need for controls on humpback whale watching trips in Hawaii will be assessed.

The NMFS will work with state, territory, and trust territory agencies to help develop laws and programs for conservation of protected species in the central and western Pacific. Consultations under Section 7 of the ESA will be carried out to prevent adverse effects on endangered and threatened species from Federal and Federally funded or authorized activities.

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OBJECTIVE: Maintain a continuing supply of reasonably priced tuna for the American consumer and the American fishing industry.

RESOURCES REQUIRED:

FY 1986

FY 1987

Obligations

Outlays

SIGNIFICANCE: MBO

The American consumer and the American tuna industry depend on a steady supply of reasonably priced tuna provided from the world's oceans by a worldwide international fishing fleet through an international commodity market. Until recently the U.S. dominated the processing and marketing sectors of the international industry as the world's largest tuna consuming nation. Recently this dominated international but the United States still has an important vested interest in orderly, well-managed international fisheries that remain free of foreign domination. Accordingly, the U.S. remains committed to international conservation and management agencies and arrangements it helped to create and support to ensure that a long-term continuing supply of tuna is maintained. However, not all of the important fisheries are managed under international agreements, e.g., albacore, and western Pacific Ocean tunas. Nevertheless, current U.S. fishery research and management efforts are aimed at creating and maintaining these international bodies.

It is convenient to divide the global fishery into five separate major fisheries, two of which are contained in this MBO: Eastern tropical Pacific tunas and Western Pacific and Indian Ocean tunas. (The other tuna fisheries, Atlantic tunas (except bluefin) Pacific albacore and Atlantic bluefin are sufficiently self-contained to warrant separate MBOs.) The significance of each of the tuna fisheries contained within this MBO follows:

Eastern Tropical Pacific:

Historically, the eastern tropical Pacific Ocean (ETP) has been the site of preferred fishing grounds of the U.S. distant-water, tropical tuna fleet. In 1984, approximately 97 U.S. vessels participated in the ETP tropical tuna fishery, down 27% from 1983. U.S. vessels comprised 52% of the total ETP fleet in 1984. U.S. landings of tropical tunas caught in the ETP totaled nearly 74,000 mt in 1984, a 23% decrease from 1983. However, the total international ETP tropical tuna catch for 1984 was up 34% from 1983, with yellowfin and skipjack catches up 49% and 7%, respectively, from 1983. The U.S. fleet, however, continued to dominate tuna fishing in the ETP during 1984, harvesting 43% of the total tropical tuna catch.

Tropical tuna Commission (IATTC) which has managed the stock from 1966 to 1979 when the withdrawal of Mexico and 175,000 mt by the IATTC which has managed the stock from 1966 to 1979 when the withdrawal of Mexico and Costa Rica from the commission precluded adoption of an annual catch quota by the remaining member countries.

U.S. processors depend on the ETP tropical tuna fishery as a source of tuna imports with almost 17,000 mt of raw yellowfin and skipjack tuna imported from adjacent countries in 1984, up 55% from 1983. Although this significant increase can be attributed to increased landings in Ecuador and Venezuela by U.S. chartered vessels, a remaining negative factor is the interest of other fishing nations in the area, who are actively developing their own tuna industries, e.g., Mexico, which has diverted a third of its catch to the European market while at the same time increased domestic consumption of canned tuna. This increased interest by Mexico and others has resulted in restricted U.S. access to traditional ETP tuna fishing areas and increased the U.S. costs of operating in the ETP.

The U.S. tuna industry is presently in an unsettled economic condition. U.S. canneries have been closing and imports of canned product have increased dramatically in the past few years.

Western Pacific and Indian Ocean:

In an effort to meet domestic demand, U.S. tuna canneries import foreign-caught tuna, which in 1984 amounted to 244,000 mt. Increased catches by the U.S. fleet could reduce this dependence on foreign imports and provide more domestic employment. The U.S. fleet, however, operating in the eastern tropical Pacific is faced with numerous problems including spiraling costs, stagnant catch rates, vessel seizures, increased foreign competition, and government restrictions on the kill of porpoise. The fleet, therefore, has turned to the western Pacific and its tuna resources for relief.

The MSY for yellowfin has been estimated to be 123,000 mt. For skipjack, the MSY has not been determined but is expected to be between 500,000 and 1 million mt per year. The MSY for bigeye tunas is estimated to be 127,000 mt with catches in recent years varying from 97,000 to 144,000 mt, indicating that the resource is probably being fished at the MSY level. With these potentials in mind the NMFS issued contracted administrators by the Pacific Fisheries Development Foundation whereby U.S. seiners explored selected regions of the western Pacific and ultimately opened a new fishery. The turning point was the development of a long (1,000 fathoms), deep (120 fathoms), and fast-sinking net made of light-weight webbing able to catch fish in the clear waters of the western Pacific.

While this new western Pacific tuna purse seine fishery was growing, the small-scale tuna fisheries in Hawaii, American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands continued to land tuna and billfish. The most important of these small-scale tuna fisheries is in Hawaii, where a skipjack pole-and-line fishery has been landing less than 2,000 mt annually in recent years, down from about

METHOD OF ACCOMPLISHMENT:

Atlantic Tuna Fisheries (except bluefin):

The NMFS will continue to collect and provide statistics and advice necessary to meet U.S. obligations and to advise U.S. commissioners on management of Atlantic tuna fisheries through ICCAT. Activities include:

1. Collection and preparation of statistics on catches and landings of tuna and tuna-like species taken by U.S. flag vessels in the Atlantic Ocean. These statistics are summarized and submitted to the commission.
2. Carrying out of scientific research to determine the condition of the Atlantic tuna stocks supporting the fishery and reporting the findings to ICCAT to assure an adequate scientific basis for regulations.
3. Providing U.S. commissioners and their advisors with technical advice related to the fishery and the condition of the tuna stocks for use in formulating U.S. policy.

Eastern Tropical Pacific Fisheries:

Assessing the biological status and the response to fishing pressure of the resources is crucial in maintaining a continuing supply of tuna and billfish from the ETP. To this end the U.S. is signatory to a treaty establishing the IATTC which is charged with monitoring and evaluating the tuna resources being exploited in the ETP. The IATTC maintains its own scientific staff to conduct investigations on the status of the ETP tuna stocks. Annually, the scientific staff at the SWC review the results of these investigations to provide advice to the U.S. commissioners to IATTC.

Access to productive fishing grounds in the ETP also affects the supply of tuna from this area. In the late 1970's, several ETP adjacent nations imposed restrictions on the fishing activities of foreign fishermen operating within their exclusive fishing zones. As a result, the U.S. and four other ETP-adjacent nations negotiated the "Eastern Pacific Ocean Tuna Fishing Agreement" (EPOTFA) which, when ratified, will provide for international access and licensing arrangements for the ETP exclusive fishing zones. Currently, this agreement has not been fully ratified by all nations utilizing ETP tunas and billfish. Personnel at SWC and SWR monitor and report progress on establishment of such an agreement.

Western Pacific and Indian Ocean Tuna Fisheries:

To accomplish the goal of harvesting Western Pacific and Indian Ocean tunas to the optimum level consistent with economic considerations and biological constraints, NMFS will develop and implement research programs centered around:

(1) Identifying specific problems, such as fishery interaction, which impinge on fishery development, management policy analysis, and evaluation of fishery statistics for stock assessment.

(2) In the Central and Western Pacific, designing and carrying out appropriate field experiments and theoretical analyses to provide information on tuna reproductive activity, distribution patterns, range of movement, residence times, and transfer rates between adjacent fishing areas.

(3) Developing biological models which lead to better understanding of tuna behavior and distribution in relation to environmental structure and variation, and how such knowledge can lead to improved harvest efficiency and better interpretation of nominal catch and effort statistics.

(4) Continuing efforts to establish a comprehensive and reliable data base of catch and effort statistics relating to U.S. and foreign tuna fisheries throughout the Western Pacific and Indian Ocean.

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III-6 NORTH PACIFIC ALBACORE

OBJECTIVE: Expand the harvest and processing of Albacore from the North Pacific Ocean by American commercial and recreational fishermen to 30,000 mt by 1995.

RESOURCES REQUIRED

Funds (\$K)
Staff Years (FTE)

	FY 1986	FY 1987
	<u>Obligations</u>	<u>Outlays</u>

SIGNIFICANCE:

The United States has an active, commercial fishery for North Pacific albacore which produces catches worth more than \$19 million annually to U.S. fishermen. Further, the amount of North Pacific albacore canned from imported and domestically caught fish was approximately 42,200 mt in 1984 and is worth \$112 to \$127 million at the wholesale level. Only 12,700 mt of the 1984 production from the stock may be near maximum although this is uncertain. The U.S. consumer has the ability to use greater quantities of albacore than the domestic fishery can presently produce. Recent evidence suggests that production from the stock may be near maximum, although this is uncertain. Through improvements in operations, marketing, and fishing strategies the U.S. fishery can improve its share of the total catch and thus influence negotiations in government-to-government talks designed to protect the resource. Albacore also are a primary target species for marine anglers in southern California. The value of this sport fishery is not known but studies are planned to derive an estimate of this value.

The South Pacific albacore stock supports substantial longline fisheries by vessels from Taiwan, South Korea and Japan, which collectively harvest 35,000 mt per year. In addition, a few thousand tons are taken in a surface fishery by New Zealand vessels. Most of the albacore catch taken by the Taiwanese and Korean longliners is canned by U.S. packers operating in American Samoa. It is believed that the U.S. could significantly increase the yield of South Pacific albacore by expanding the harvest of smaller fish in the surface waters using trolling vessels now occupied in the North Pacific albacore fishery but deploying them during January-March when they might otherwise lie idle.

METHOD OF ACCOMPLISHMENT:

To work in the North Pacific requires an extensive multidisciplinary effort integrating stock assessments, fishery and environmental relationships and the evaluation of the technical alternatives specified in albacore program planning documents. Specifically scientists at the SWI/SWC are involved in: (1) Securing adequate statistics to estimate the condition of the fishery and the resource. (2) Conducting quantitative studies to determine the status of the resource, its availability and migration; (3) Quantifying the

effects of environmental variables on fishing success; (4) Evaluating and assessing alternatives in markets and preservation methods applicable to the fishery; (5) Completing economic analyses to estimate the economic value and impacts of recreational fishing for albacore.

A program plan for work in the South Pacific will be prepared should the U.S. Industry begin an experimental surface fishery in the area. Scientists and managers in the SAC/SJR will continue to monitor the status of the resource and fishery using available statistics from other countries.

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